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ODO BUJWID — AN EMINENT POLISH BACTERIOLOGIST AND PROFESSOR AT THE JAGIELLONIAN UNIVERSITY

Abstract: To celebrate the 650th Jubilee of the Jagiellonian University, we would like to give an outline of the life and work of Odo Bujwid, known as the father of Polish bacteriology. The intention of the authors is to recall the beginnings of Polish bacteriology, the doyen of which was Professor Odo Bujwid, a great Polish scholar who also served as a promoter of bacteriology, a field created in the 19th century. He published about 400 publications, including approx. 200 in the field of bacteriology. He is credited with popularizing the research of the fathers of global bacteriology — Robert Koch and Louis Pasteur — and applying it practically, as well as educating Polish microbiologists who constituted the core of the scientific staff during the interwar period.

Key words: Polish bacteriology, Cracow, Odo Bujwid, Jagiellonian University.

To celebrate the 650th Jubilee of the Jagiellonian University, we would like to give an outline of the life and work of Odo Bujwid, known as the father of Polish bacteriology. In accordance with the motto accompanying the celebration of this major anniversary, i.e., "Inspired by the past, we are creating the future 1364–2014" and as employees of the Jagiellonian University, where this great Polish scholar was teaching and promoting the field formed in the 19th century — bacteriology — by looking back at the life and scientific work of Bujwid, we would like to draw inspiration and willingness to do academic work. We, who are at the beginning of this journey, as well as those who are already experienced researchers. We also hope that the attitude of Professor Odo Bujwid will inspire the medical students and students of other faculties at the Jagiellonian University Medical College to acquire knowledge diligently and with the same energy that accompanied the first bacteriologists.

CHILDHOOD AND YOUTH

Odo Feliks Kazimierz Bujwid was born on 30 November 1857 in Vilnius. His father, Feliks Bujwid, was a government official. Odo spent his childhood years with

his parents in Vilnius, but the Bujwid family, out of necessity, had to move to Warsaw as Feliks Bujwid had supported the January insurgents and, therefore, encountered persecution [1, 2]. In Warsaw, the family lived in difficult material conditions. Soon, Odo's parents died and he became an orphan (he was 15 years old) together with his two younger sisters. In order to support his siblings, Odo began to give private lessons. He attended the Third Gymnasium in Warsaw, but he did not graduate. He passed the school-leaving examination extramurally and, in 1879, enrolled in the Faculty of Medicine of the University of Warsaw, which was a Russian university at the time [2, 3].

THE PERIOD OF STUDIES

Bujwid was a diligent student and, already during the first year, displayed an interest in science which surfaced through the development of a script to study botany based on the lectures of Prof. Fischer von Waldheim with hand-made illustrations. During his summer holidays following the first year, he went to Ciechocinek as a tutor, where he drew up his first papers devoted to the composition of air in the vicinity of the iodine graduation towers and chemical composition of water from the new therapeutic source (it was Bujwid's first publication in *Gazeta Lekarska*) [2, 3]. In the second year of study, he became interested in Histology, taught by Prof. Henryk Hoyer, who became Bujwid's 'model researcher professor' [3, 4]. Under the supervision of Prof. Michaił Szałfiejew, he prepared a study on the chemical composition of human saliva [2]. In the laboratory of Prof. Vilém Dušan Lambl (discoverer of the flagellate *Lamblia intestinalis*), he conducted research into sputum in respiratory tract diseases and wrote a paper on alkaloids contained in human saliva, which was published in *Archiv für Pathologische Anatomie und Physiologie*. As a fifth-year student, Bujwid studied bacilli in bronchial secretions, sputum, and saliva. In 1884, he received the gold medal awarded by the Board of the Faculty of Medicine at the University of Warsaw for his dissertation entitled "Microscopy and microchemistry of sputum in respiratory diseases" [2, 3]. The thesis appeared in print with an added lithographic atlas, executed based on Bujwid's drawings. These were the first in Poland, and probably also the first in the world, color images of tuberculosis bacilli [2]. The book was used for teaching students and physicians [3, 5].

At that time, the first reports of Prof. Robert Koch appeared of the discovery of bacteria probably causing tuberculosis. Prof. H. Hoyer was the first to study the mycobacteria in Poland, and together with him was Bujwid, who employed Koch's staining method, and subsequently Ehrlich's staining method. Bujwid sent Koch his dissertation and handmade specimens from tissues affected by tuberculosis [2]. In response, he received an invitation to the first six-week-long bacteriology course organized at the Institute of Hygiene in Berlin [3]. Bujwid

left for Berlin in 1885 thanks to the support of Dr. Tytus Chałubiński and the financial support of the Dr. Józef Mianowski Scientific Aid Fund [2, 5, 6]. The course was attended by seventeen bacteriologists, among others, Shibasaburo Kitasato (the Japanese co-discoverer of diphtheria and tetanus antitoxins and plague bacilli) and William Welch (the American discoverer of gas gangrene bacilli) [2]. Upon his return from Berlin, Bujwid set up Poland's first bacteriological laboratory, in Warsaw, where he conducted courses for students and physicians [1–3, 5, 7]. In the academic year 1885/1886, he graduated from medical studies and received his diploma on 14 January 1886 [2].

THE PERIOD AFTER GRADUATION — WARSAW

In 1885, Louis Pasteur discovered a vaccine against rabies. At the beginning of 1886, again, thanks to the support of Dr. Tytus Chałubiński, Bujwid went to Paris for another course. There, he became acquainted with the method of preparing rabies vaccine [1–3, 7]. Upon the completion of the course, he received two rabbits infected with rabies (*fixed virus*) from Pasteur [2, 8]. When he returned to Warsaw, Bujwid set up the first Polish, and the second global, Vaccination Center making use of the Pasteur method (the so-called Pasteur station) [1, 3, 5, 6, 9]. In addition, he expanded his laboratory and popularized bacteriology among physicians by conducting courses [2, 3, 5].

In 1887, Bujwid published his lectures in a book entitled "Five lectures on bacteria and an outline of general principles of bacteriology as applied to transmissible diseases and accompanied by remarks on immunization" [8]. The book was deemed the first Polish textbook of medical bacteriology (translated into Russian in 1888, and into Esperanto in 1912) [2, 3, 5]. Also in 1887, Bujwid announced that he had developed a biochemical method for the detection of Vibrio cholera in culture (*Vibrio cholerae* color reaction), which gained popularity in the scientific world [2, 5]. Bujwid's scientific interests were very extensive. Has detected a favorable influence of glucose on the development of staphylococci, obtained one of the first actinomycete cultures in the world [2]. He worked not only in Warsaw, but also in St. Petersburg and Odessa, supporting the work of the local bacteriological laboratories [2, 3, 7].

In 1890, Bujwid went to the Hygiene Institute in Berlin again, following the news that Robert Koch had obtained a remedy (vaccine) for the treatment of tuberculosis. He received a small amount of 'Koch's fluid,' however, he did not get to know the composition of the fluid or the method of its preparation, since it was under patent protection [1–3]. Upon his return from Berlin, still in 1890, Bujwid began research and prepared his own preparation designed to treat tuberculosis and called it *tuberculin* [1, 3, 8]. He sent a sample to Koch and published the information about how to obtain tuberculin in *Lekarska Gazeta* in

1891 [2]. The name *tuberculin* was adopted by Koch, who called his remedy *old tuberculin* (German: *Alte Tuberkulin*) [1, 3, 5, 7].

In 1891, in Warsaw, Bujwid launched the first Food Research Institute in Poland, where he devoted a lot of his time and attention to hygienic bacteriological examination. He initiated, as the director of the company, conducting systematic testing of the Vistula water, developed a method for bacteriological examination of water, and supported the construction of the municipal waterworks [2, 3, 7, 8].

CRACOW

Bujwid moved to Cracow in 1893 to take over the management of the Special Chair of Hygiene at the Jagiellonian University (he was appointed professor by a letter of 13 April 1893) [1, 3, 8, 10]. Shortly after the arrival, he arranged for the second Polish Pasteur station, later called *Bujwid's Serotherapeutic Institute* [2, 3, 6]. Bujwid also devoted himself to the continuation of research on tuberculosis by addressing, inter alia, the epidemiology of the disease, tuberculin sensitivity tests, and livestock tuberculosis [2].

Soon after Emil von Behring's findings, Bujwid obtained the first diphtheria antitoxin in Poland and, still in 1894, he began the production of this serum in Warsaw and Cracow [3, 5, 8]. The production of diphtheria antitoxin saved the lives of many thousands of children. In parts of Galicia, mortality rate due to this illness fell from 14,000 to 3,000 [8]. After some time, he began to produce other sera and vaccines, such as tetanus antitoxin, anti-streptococcal serum, and antipurples serum [1, 5].

From 1894, Bujwid, apart from lectures in hygiene, also conducted tutorials in hygiene and bacteriology, and in the academic year 1894/1895, he separated these subjects [8]. In 1897, Bujwid was appointed director of the Food Research Institute in Cracow. The unit carried out research mainly into specimens of milk, cheese, and bread. As the director of the unit and, at the same time, city council member, he contributed to the selection of a favorable spot for the location of Cracow waterworks. In 1907, due to employees' intrigues, Bujwid resigned from his duties as the director [7]. In 1899, he was appointed full professor of hygiene and bacteriology and, in the academic year 1904/1905, he was dean of the Faculty of Medicine at the Jagiellonian University [8, 10]. During the First World War, he provided a vaccine against cholera to the Austrian army, and later to Polish legionaries [3, 7]. In the interwar period, Bujwid was devoted to his Serum and Vaccine Production Units. He organized cultural, scientific, and social life. All these activities met with severe criticism from academic, ecclesiastical, and political circles of Cracow [8, 9]. Nevertheless, Bujwid enjoyed great recognition and respect of the academic youth. He taught medical students to develop diets for the healthy and the sick, indicated and demonstrated methods of testing food

products. Additionally, he took students to dairies, slaughterhouses, and bakeries and made the youth aware of the workers' poverty and the conditions that prevail in these establishments, through which he promoted occupational health [7]. In 1920, he officially ended his cooperation with the Jagiellonian University and departed on early retirement, although he had been replaced by his student, Dr. Roman Nitsch, as the head of the Chair since as early as 1916 [2, 9].

RETIREMENT YEARS

While retired, Bujwid remained very actively involved in the scientific life by, among others, participating in scientific conventions [2]. Professor Odo Bujwid published about 400 publications, including approx. 200 in the field of bacteriology [3, 6, 8]. He continued to popularize Koch's and Pasteur's research and utilized it practically [4]. In 1932, after the death of his wife (he was 75 years old), he began to write memoirs entitled "Solitude. Memoirs from the years 1932–1942" [4, 5]. During the Second World War, he was repeatedly interrogated and his family was repressed. Bujwid died on 26 December 1942 in Cracow [2, 5].

Bujwid's interests and activities encompassed not only research but also the organization of cultural and social life. He conducted numerous courses in microbiology and hygiene for physicians, farmers, and the general intelligentsia. He wrote popularizing textbooks and publications and was fighting for the rights of women to study at universities. Together with his wife, Kazimiera Bujwidowa, née Klimontowicz, he contributed to the creation of the first female gymnasium in Cracow in 1896. He collected donations and helped build Polish schools in the period of partitions of Poland. He traveled extensively, for instance, to South America, where he visited the Polish community living there. He supported reforms in agriculture [3, 6, 7]. Bujwid was close friends with Ludwik Lazarus Zamenhof, the creator of Esperanto [1]. During the 8th World Congress of Esperantists in Cracow in 1912, he served as president of the organizing committee. In 1922, during the 1st Polish Congress of Esperantists, he was elected President of the National Federation of Esperanto, and, in 1924, he brought Polish Esperanto movements to unification. He also served as editor of *Pola Esperantysto*, and in recognition of merits, he was, among others, elected an honorary member of the World Association of Physicians Esperantists [2].

RECAPITULATION

The intention of the authors is to recall the beginnings of Polish bacteriology, the doyen of which was multi-talented and educated Professor Odo Bujwid. He is credited with popularizing and applying in practice of the research of the fathers

of global bacteriology — Robert Koch and Louis Pasteur — and teaching Polish microbiologists, who constituted the core of the scientific staff during the interwar period, such as, Roman Nitsch, Filip Eisenberg, and Roman Gieszczykiewicz, who continued their work in Lviv, Poznań, Warsaw, and other academic centers [6, 8]. Professor Bujwid wrote in his memoir: "After all, my life was not wasted, I managed better than many people in my surroundings. I experienced a lot and lived to such an advanced age, and I can still observe what people coming after me are doing and how they are developing the things that I have loved. The only regret is that things do not go as we'd like" [4].

CONFLICT OF INTEREST STATEMENT

None declared.

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